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Graduate School of Management

Master in Corporate Finance

Master's Thesis

Earnings Management in the EU Banking Sector: Impact of Shifting to Expected Credit Loss Model

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ЗАЯВЛЕНИЕ О САМОСТОЯТЕЛЬНОМ ХАРАКТЕРЕ ВЫПОЛНЕНИЯ ВЫПУСКНОЙ КВАЛИФИКАЦИОННОЙ РАБОТЫ

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I, Mohammadmahdi Norouzpour, second-year master student, full-time program «Corporate Finance» state that my master thesis on the topic « Earnings Management in the EU Banking Sector: Impact of Shifting to Expected Credit Loss Model », which is presented to the Master Office to be submitted to the Official Defense Committee for the public defense, does not contain any elements of plagiarism.

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5/25/2021

АННОТАЦИЯ

Автор	Махаммадмахди Норузпур
Название магистерской диссертации	Манипулирование прибылью в банковском секторе ЕС: влияние изменения учетных трактовок на оценку ожидаемых потерь по ссудам
Факультет	Высшая школа менеджмент
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Год	2021
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Описание целей, задач и основных результатов	Это исследование направлено на количественную оценку возможного воздействия изменений в требуемом порядке учета резервов на возможные потери по ссудам в январе 2018 года (от модели понесенных убытков к модели ожидаемых кредитных убытков) на уровень манипулирования прибылью капиталом в банковском секторе ЕС. Для этих целей было собрано и проанализировано 1133 наблюдения за период с 2015 по 2020 годы. Результаты показали усиление манипулирования прибылью и капиталом после применения новой модели за счет дополнительной свободы действий по созданию резервов на покрытие убытков по ссудам в рамках новой модели.
Ключевые слова	Управление прибылью, Управление капиталом, МСФО (IFRS) 9, Модель ожидаемых кредитных убытков, Банковский сектор, Европейский Союз

ABSTRACT

Masters Student's Name	Mohammadmahdi Norouzpour
Master Thesis Title	Earnings Management in the EU Banking Sector: Impact of Shifting to Expected Credit Loss Model
Faculty	Graduate School of Management
Major Subject	Coroporate Finance
Year	2021
Academic Advisor’s Name	Nikulin Egor Dmitrievich, Associate Professor, Department of Finance and Accounting
Description of the goal, tasks, and main results	This study aims to quantify the possible impact of changes in the required accounting treatment of loan loss provisioning in January 2018 (from incurred loss model to the expected credit loss model) on the level of earnings and capital management within the EU banking sector. For these purposes, 1,133 observations for the sample period between 2015 to 2020 have been collected and analyzed. The results showed an increase in earnings and capital management behavior after applying the new model due to the additional discretion in the new loan loss provisioning model.
Keywords	Earnings Management, Capital Management, IFRS 9, Expected Credit Losses Model, Banking Sector, European Union

Contents

Introduction

The International Financial Reporting Standards foundation aims to improve financial reporting quality by setting and improving its accounting and reporting standards. This not-for-profit organization's strategy is to make global financial markets transparent and efficient. European Union Commission has the exact expectations as requiring public companies to apply IFRS standards for consolidated figures from 2005 onwards[1] to enhance the comparability and maintain public trust and confidence in market functionality. IASB, since 2008, had the research project to decrease the complexity of financial instrument recognition and measurement. The Incurred Loss model was evaluated as a weak recognition model during the financial crisis due to delayed recognition, causing increased income smoothing among the banks (Lee J. Cohen, 2014) and other firms (Vedran Capkun, 2016). Following the Financial Crisis Advisory Group's recommendation on having a more forward-looking alternative model to incurred loss treatment[2], the Board issued an Exposure Draft[3] for Expected Credit Losses of Financial Instruments in March 2013. Finally, in July 2014, the Board published IFRS 9 Financial Instruments, including the replacing impairment requirements for an entity's expected credit losses accounting on its financial assets and commitments to extend credit. The mandatory application of such treatment took place on 1 January 2018. At the IFRS mandatory adoption in 2005, most European countries had to change the accounting treatment from expected loss models to the IAS 39 incurred loss model. Hopefully, though several findings agree that the IAS39 application as part of IFRS adoption in the European Union has reduced the banks' income smoothing (Gebhardt, 2011; Anandarajan, 2011) and other non-financial firms earnings quality (Mary E. Barth, 2008), some criticize the incurred loss model's tardiness, especially during financial crises (Gebhardt, 2011). The importance of this research is to attempt to figure out the possible impact of the turn in the standards, whether if it has resulted in enhanced earnings quality or not. Under the impairment requirements in IAS 39, the recognition of such loss was subject to objective evidence considering only past conditions and current events for the determination of the amount and, in contrast, IFRS 9 explains that changes in credit risk are assessed based on changes in the risk of a default occurring over the expected life of the

1 Regulation (EC) no 1606/2002 of the European Parliament and of the Council of 19 July 2002 on the Application of International Accounting Standards

2 Report of the Financial Advisory Group, July 2009, pg. 6

3 IFRS Exposure Draft ED/2013/3 Financial Instruments: Expected Credit Losses

financial instrument (Arta Limani, 2017). The transition to the ECLM has an impact on some key financial performance indicators within the banks. It gives more room for judgment and significant estimations. Some banks may experience a decrease in allowance due to reclassification to Fair Value Through Other Comprehensive Income but mostly have already experienced an increase in allowance (Laure Guegan, 2018). Some findings suggest that the incurred loss model boosts the loan market procyclicality while the ECLM solves the issue (Vincent Bouvatiera, 2012).

Nonetheless, there has not been well-justified research applying the methodology to similar and outstanding earnings management studies to approve. The research goal in this study is to figure out the possible impact of the new provisioning model on the extent of earnings and capital management by applying a proper methodology and modeling. The results would be pretty essential to examine the changes in the earnings quality and evaluate the implementation and application of the new standard.

The first chapter will discuss the main definitions and background of research in earnings and capital management and related past workings in the banking industry. In the second chapter, we summarize the methodological approach in similar studies, justify and apply the methodology to the collected data. Following the preliminary results of the analysis and the interpretations, we conclude the study results.

Chapter 1: Theoretical Background and Literature Review

1.1. Earnings and capital management literature

1.1.1. Earnings management definition and importance in financial studies

Earnings have proven to be one of the most important financial figures for different users of financial statements. Earnings provide essential information for the decision-making of equity, debt capital participants, labor, material, product, and political markets, as Lev has specified twenty years of his research on this topic (Lev, 1989). Investors respond to several proxies of earnings quality and consider it one of the key performance indicators. Earnings formulate the investors' financial decision basis due to the signaling effect (Patricia Dechow, 2010; Anwer S. Ahmed C. T., 1999). For an economic entity, it is highly essential to maintain the profits level. For such purposes, they may exercise methods to control the reported figure. Therefore, companies may try to achieve earnings persistence in the short-run by engaging in earnings management (Patricia Dechow, 2010).

Researchers define Earnings management as managers' techniques and tricks to affect the reported earnings figure for specific purposes. Healy has defined earnings management as below:

"Earnings management occurs when managers use judgment in financial reporting and in structuring transactions to alter financial reports to either mislead some stakeholders about the underlying economic performance of the company or to influence contractual outcomes that depend on reported accounting numbers."

In early studies in earnings management, several findings show shreds of evidence of firms trying to improve their earnings level and avoid unusual fluctuations by exercising earnings management to avoid such deteriorations (Healy, 1999; Anwer S. Ahmed C. T., 1999; McNichols, 1988; Deangelo, 1988; David C. Burgstahler, 2006). Healy summarises the review on studies from Burgstahler, Dichev, and Degeorge et al. as discoveries of earnings management within companies by assessing and examining the distribution of reported earnings. They figure out that the entities that are reporting positive earnings figures are more than expected. Such deterioration is interpreted as earnings management to avoid damaging or declining earnings due to market impact. However, He emphasizes the lack of studies in these researches on examining whether additional standards or different rules could avoid the managed earnings.

Manipulation of profits, from a managerial perspective, may have different incentives. They encourage improving market expectations and the valuation of the firm. Some contracts refer to accounting figures (e.g., debt covenants), or some government regulation concerns may motivate managers to be involved in earnings management (Healy, 1999). Most managers admit exercising earning smoothing to keep the earnings within a predictable and satisfactory level as a performance measure (John R. Grahama, 2005). Several types of research mainly pointed out earnings management as a signaling effect (Anwer S. Ahmed C. T., 1999; William H. Beaver, 1996). Beaver et al. and Wahlen believe that an unusual increase in loan loss provisions is considered optimistically to show the banks' financial health and encouraged with positive signals by market participants. (Wahlen, 1994; Beaver, 1989).

Leuz et al. emphasize the expectation of such exercise to reduce the firm's interest protection respect for corporate governance and insider trading (Christian Leuza, 2003). Researchers and professionals state different consequences of earnings management for the firm and its stakeholders. Since the manipulated figure is not truly reflecting the firm's performance, it misleads investors and threats their interest and other users of financial statements. (Somnath Das, 2011) Such earning smoothing is at the expense of long-term economic consequences as it boosts the stock market price in the short term, even though it is not in line with the interest of shareholders (John R. Grahama, 2005).

1.1.2. Modelling and measuring the earnings management

The purposive application of earnings management has been proven by affecting cash flow from operations, and working capital changes avoid losses or decreases in earnings (David Burgstahler, 1997). There are several models developed to determine the extent of earnings management. Starting from Healy's model, he considers earnings management as a recurring event that repeats over time. It considers discretionary accruals as the difference between total accruals and normal (non-discretionary) accruals. However, the model uses the average of total accruals over the last five years to measure normal accruals to reflect the long-term average. In Dangelo's model, last year's total accruals are the measure of normal accruals. Hence, any change in accruals this year compared to the previous year is considered discretionary. It reduces the serial correlation that might exist in Healy's model because it only takes the last year's total accruals rather than the last five years' total accruals into consideration when calculating normal accruals. In McNichols's study, he tried to model the accounting number that should have been reported in the absence of

earnings management by considering the difference with the actual figures is a discretionary accrual proxy, as the single accrual component (representative approach). Therefore, his model does not recognize the manipulation of accruals other than the provision. He viewed his design as trading off comprehensiveness against more precise modeling of the non-discretionary component. Similar to previous innovative research in modeling, McNichols follows the same regression framework by selecting a proxy for discretionary accruals and isolating the predictability of earnings management (McNichols, 1988).

One of the most famous models in calculating earnings management is the Jones model. In this model, the non-discretionary accruals are constant, attempting to control changes in a firm's economic situation. The underlying assumption is that the revenues are non-discretional. In the modified model, the misinformation of discretion over revenues is eliminated. The only adjustment relative to the original Jones Model is that the change in revenues is modified for the change in receivables in the event period, at which the earnings management is hypothesized.

Dechow states that all of the above models are well-specified to a random sample and test the low power of earnings management of economically plausible magnitudes. However, the modified Jones model gives the most potent test among the others (Patricia M. Dechow R. G., 1995).

The improved Dechow's model incorporates a flexible framework for reversals. Nevertheless, she recommends that the researchers consider economic characteristics, caution in using performance matching, and concerns of the reversals' timings in choosing the appropriate model (Patricia M. Dechow A. P., 2012). Moreover, the extent and the magnitude of past accrual-based earnings management and reversal speed at past discretionary reversals can be considered (Baber, 2011).

Model	*Specification*	*Factors*
Healy	Recurring EM	Average of total accruals over the last five years
Dangelo	Reduced serial correlation	Last year's total accruals
McNichols	Representative approach	Manipulation of provision
Jones and Modified Jones	Modify revenue for changes in receivables	Revenue as a non-discretional component
Dechow	Reversals	Lagged, current, and lead cash flows from operations

Table 1: Differences between the developed earnings management models

1.1.3. Earnings smoothing through provisions and allowances

One of the primary focuses of earnings management studies revolves around earnings management using provisions and allowances as discretionary accruals components. Several findings emphasize the application of loan loss provision as a proxy of earnings management (Anne Beatty, 1995; Deangelo, 1988; Ma, 1988; Collins, 1995)

DeAngelo tried to model the bad debt provision without earnings management to use the model's expected provisions to test earnings management (Deangelo, 1988). The proxy for discretionary earnings management is the residual provision for bad debts. The authors model the expected provision for bad debts as a linear function of the beginning balance in the allowance for bad debts and the magnitude of current and next year's write-offs. The model yields a residual bad debts provision that primarily reflects the discretionary accrual. He also noted that the determination of bad debt provisions was mainly a mechanical procedure (such as a fixed percentage of sales or receivables balance or aging receivables). Therefore, such earnings management potential can be relatively low. It was challenging to incorporate future write-offs into the model. Also, there might be potential cross-sectional or time series variants in the model's coefficients.

McNichols had the same idea of considering the bad-debt provision as a discretionary accrual item for exercising earnings manipulation (McNichols, 1988). He presents bad-debt provision more as a single accrual item (representative approach) rather than a collection of accruals (portfolio approach) with a consideration to extend the discretionary accrual proxy by using related

GAAP. By modeling the provision for bad debts, he tried to specify a discretionary accrual proxy that is substantially free of non-discretionary components. The author proposes that the deviation from the modeled provision reflects earnings management. His results suggest an income-decreasing approach to earnings management, contrary to the previous studies in the income smoothing hypothesis. The income smoothing hypothesis predicts that firms choose accruals to minimize the variance of reported earnings, which means that when income is unusually high, income-reducing accruals are chosen, and when income is low, the income-increasing accruals will be selected.

1.1.4. Capital management and its disincentives to income smoothing

As discussed previously, managers within entities, including banks, may exercise discretion over accounting and regulatory required ratios to keep their adherence and consistency with the current level of the figures and required minimum figures. Such discretions may also be exercised for capital adequacy ratios that banks are regulated to report and keep these figures more than a minimum threshold. Capital management is considered an exercise of discretion in any element of capital adequacy calculations to maintain the reported ratio. The banking companies are under surveillance of the regulators with accounting measures such as regulatory capital. Banks may need to maintain their level of capital under different circumstances such as growth opportunities, acquisitions, increase in the base loan portfolio, and financial crisis. Since allowance forms part of the core capital in the nominator of capital adequacy ratios, the banks could improve the ratio by increasing the loan loss provisions and decreasing loan charge-offs (Collins, 1995).

Moyer studied US commercial banks and discussed the manager's motives regarding the minimalization of regulatory costs. She specified the model applied by McNichols (McNichols, 1988) in earnings management to narrow to the specific accounting components that can be adjusted respectively to manage the capital adequacy requirements and related costs. For this study, the primary capital ratio that was regulated in 1986 by the US Federal Reserve was measurable by dividing primary core capital (including loss allowance) by gross assets. According to the regulated formula for the ratio, managers could simply increase their capital adequacy ratio by additional provisioning (Moyer, 1990). As per the analysis results, she concludes applying capital management within US banks by increasing loan loss provision. However, she could not find any evidence to identify the discretion of security gains or losses.

Beatty et al. analyzed public and private banks with slight earnings increase or decreases as suspicious to earning and capital management (Anne Beatty, 1995). They refer to the studies of Burgstahler and Dichev, which documents that banks with more consecutive small increases in earnings than decrease are the result of using loan loss provisions and security gains and losses to eliminate the decreases (David Burgstahler, 1997). Using data samples from the US bank reports between 1986 to 1998, the results of their study show discretion in loan loss provisions but no evidence on security gains or losses.

Collins et al. were more focused on capital-related decisions that may motivate managers to exercise capital management. In such situations, the denominator increases due to growth in deposits or acquisitions, but the nominator usually does not increase to the same extent. Therefore, the managers may adjust loan loss provisions to maintain the current ratio of the regulatory capital (Collins, 1995).

After 1989 changes in banking regulations, since the newly announced primary capital ratio computation, the allowance was excluded from the regulatory capital. Therefore, the positive effect of provisioning is removed from the ratio, and as a result, any increase in LLP only decreases the adequacy ratio. Consequently, banks may have an incentive to reduce LLP to maintain the primary capital ratio above the minimum level. Kim and Kross pointed out that as there was no incentive to increase LLP, such a component was no longer a proxy to maintain the minimum capital. Instead, banks with high capital increased the charge-offs, constituting a capital management behavior (Kim, 1998). Ahmed et al. also investigated the changes in capital adequacy requirements in applying earnings and capital management as signaling to the shareholders. Their study shows that banks managed LLP for capital adequacy purposes, unlike earnings management, which is not significant in this aspect (Anwer S. Ahmed C. T., 1999).

1.2. Earnings management in the banking industry

1.2.1. income smoothing in the banking industry using loan loss provisions

In several papers, loan loss provision is the primary earnings management tool in the banking sector as loan loss provisions are relatively large accruals for commercial banks and significantly impact banks' earnings (Lee J. Cohen, 2014; Healy, 1999; Anwer S. Ahmed C. T., 1999; William H. Beaver, 1996).

Ma et al. studied the earning smoothing within the US banking sector and documented that loan loss provisions and charge-offs have been used as discretionary components irrespective of the actual quality of loan portfolios. The banks raised the loan loss provision expense in the periods with higher income and lowered such amounts in periods with low earnings levels (Ma, 1988). Collins et al. investigated the banks' financial decisions as they point out the different approaches taken to respond to earnings management incentives. Their result is consistent with the previous ones where the banks use loan loss provisions for income smoothing (Collins, 1995).

There are different motives in banks to be involved in such income smoothing. Beatty's analysis shows that public banks use discretion in their loan loss provisions and recognize security gains and losses to avoid reporting small declines in earnings (Anne L. Beatty, 2002). The reason for such treatment, hypothetically, can be either to improve the risk perception of a bank or managerial self-interest to smooth earnings. It can also be the result of bankruptcy concerns (Ana Rosa Fonseca, 2008). Wahlen's evidence suggests that when bank managers think the future cash flow will improve, they increase the discretionary component of unexpected loan loss provisions (Wahlen, 1994). There are findings that banks use loan loss provisions to manage earnings, particularly to meet regulatory requirements. Those banks close to minimum capital requirements, overstate loan loss provisions and understate loan write-offs (Healy, 1999). Kilic has stated that the banks rely on loan loss provisions as a possible way in which they can respond to ineffective hedging (Emre Kilic, 2013)**.**

The extent of such exercise may differ among the banks. Fonseca argues by his studies that such income smoothing depends on investor protection, disclosure, regulation and supervision, financial structure, and financial development (Ana Rosa Fonseca, 2008). Banks may also try to manipulate earnings figures due to the recession and economic crisis. Cohen concludes that the downside risk for banks exhibiting earnings management in the pre-crisis period is substantially higher during the crisis years (Lee J. Cohen, 2014). However, having a contradictory effect with regulatory capital incentives, earnings management may not significantly determine loan loss provisioning (Anwer S. Ahmed C. T., 1999; Anne Beatty, 1995).

Periodic stock returns and earnings announcement date, stock price reactions confirm that investors interpret discretionary components of unexpected provisions as "good news," showing how earnings management affects capital markets' movements. Cohen et al. also reveal that even though they could not find any coherent evidence of the association between earnings smoothing

and insolvency risk in their research, they emphasize how important and predictable, such figures become in distressed situations as the banks may decide to manipulate LLP to mitigate with capital adequacy requirements (Lee J. Cohen, 2014).

1.2.2. Earnings and capital management within the EU banking industry

Most of the researches and studies in earnings management within banking sectors examine the income smoothing hypotheses alongside capital management (Anwer S. Ahmed C. T., 1999; Anne Beatty, 1995; Collins, 1995).

Collins et al. and Beatty et al. examined such a hypothesis before the Basel Tier 1 and Tier 2 requirements, referred to as the old capital adequacy regime before 1990. Ahmed et al. investigated the capital management issue after introducing new requirements. Moreover, loan loss reserves are not forming part of the Tier 1 nominator according to the new requirements. Nevertheless, the Tier 2 ratio still has loan loss reserve as part of the nominator. They documented capital management as an essential determinant of loan loss provisions, unlike the evidence about income smoothing (Anwer S. Ahmed C. T., 1999). Beatty et al. suggest that banks use loan charge-offs and provisioning as tools to trade off against gains or losses on financial investments for capital adequacy incentives, making the earnings management decisions more complicated (Anne Beatty, 1995). Anandrajan et al. pointed out that banks exposed to higher default costs on capital adequacy requirements are usually more inclined to involve in capital management behavior. Such ratios are highly crucial, especially before a merger or takeover. Therefore, the banks may try to improve such ratios to reduce the related legal and compliance costs. Moreover, all of these researches have assumed the consistency of other decisions while the managers may decide about manipulating a particular transaction or figure (Anandrajan, 2003). However, Beatty et al. study had the feature to examine both earnings and capital management decisions simultaneously.

1.3. IFRS and Basel requirements and their impact on earnings and capital management

1.3.1. European Union involvement in IFRS adoption and Basel requirements

European Council meeting on 23rd and 24th March 2000 decided to urge public companies to adopt International Accounting Standards to enhance comparability and transparency to benefit investors and other stakeholders. As a result, they passed regulation no 1606/2002 of the European Parliament and The Council of 19 July 2002 on the application of international accounting

standards, which requires European Union public companies to report their consolidated figures based on IFRS and permits unlisted companies to adopt the standards for reporting.

However, after ten years of mandatory adoption regulation, the EU Commission evaluated by seeking public consultation with stakeholders. The commission declared its satisfaction with the quality of the implemented requirements for IFRS reporting as they urge IFRS standards to become global and promote their convergence with the US SEC. The report points out the criticism about the incurred loss model as a "too little, too late" way of provisioning. It expects to have improvements in reporting quality after the application of the replacing IFRS 9 requirements, which is also going to resolve the lack of disclosure in the banking sector (EU, Evaluation of Regulation (EC) N° 1606/2002 of 19 July 2002 on the Application of International Accounting Standards, 2015).

Furthermore, the European Commission has also been passing rules out to improve the quality of reported regulatory capital of the banking sector and required the credit and financial institutions to follow the single set of Basel III framework to have harmonization and consistency (EU, 2013). Basel committee is a global banking prudential standard-setter that has been initially formed to improve to prevent future financial disasters by improving banking supervision. The Committee issued a revised Basel II framework, the former capital adequacy accord, in 2004, which established the minimum capital requirements. The concerns are not just about the accounting standards. Following the Financial Stability Boards' report to G20 leaders, they emphasized the need to revise financial systems addressing the Basel committee to develop new rules to improve the reported capital quality. The relevance with the loan loss provision is in the capital adequacy tier 1 calculation, which divides common stock and retained earnings by the risk-weighted assets (RWA). It is essential to notice the interaction between the IFRS new requirements for provisioning and Basel framework updates regarding the 1st Tier Capital Adequacy ratio. The European Commission states that in 2013, following the financial crisis, the required changes in banking regulations. It mentions several shortcomings with the Basel framework as the banks failed to manage their risk involving liquidity due to a weak governance structure. In 2010, following the FSB statements, the Basel Committee issued a new Basel III framework for the global banking industry. The Committee finalized the framework in December 2017, and the fully effective date for implementation was January 2019.

Nevertheless, the banks have already started to follow the requirements from 2013. The critical differences between Basel II and Basel III are the prescription of other types of common equity and the introduction of several other metrics of buffering leverage, such as liquidity coverage ratio. Therefore, there is no simultaneous significant change in Tier 1 and Tier 2 requirements with IFRS changes involving loan loss provisioning. Capital restriction, balanced liquidity, and leverage requirements may motivate the managers, especially distressed banks, to manipulate earnings figures by reducing loan loss provision.

As per the Basel requirements, Tier 1 and Tier 2 ratios are calculated as per the formulas (1) and (2) as below:

$$TIER1 = \frac{TIER\ 1\ Common\ equity\ items}{Risk\ Weighted\ Assets} \quad (1)$$

$$TIER2 = \frac{TIER\ 2\ Common\ equity\ items}{Risk\ Weighted\ Assets} \quad (2)$$

The common equity items in this ratio consist of qualified equity instruments, share premium of these instruments, retained earnings, accumulated comprehensive income, other reserves, and funds for general banking risks. Tier 2 items also consist of subordinated loans on the nominator, and the denominator is credit-risk adjusted. The minimum required Basel II core Tier 1 ratio was 2%, and the required minimum rate changed to 4.5% in Basel III effective from January 2019. On the other hand, Tier 2 minimum required ratio in Basel II was 4% which changed to 2% in the Basel III framework.

Following the mandatory adoption of IFRS within the European Union, several researchers attempted to identify the effect on reporting quality and be more specific on earnings management. Researches had mixed results (Navarro-Garcia, 2014; Zéghal, 2011; Mary E. Barth, 2008; Doukakis, 2014; Capkun, 2016; Anandarajan, 2011; Gebhardt, 2011). Zéghal et al. analyzed the effect of mandatory adoption on French companies. Besides, he examined the effect of six factors on earnings management. These six factors consisted of independence and the board of directors' efficiency, separation of roles of CEO and Chairman, the existence of an independent audit committee, the existence of block shareholders, quality of the external audit, and listing on foreign financial markets. They used observations from 2000 till 2007 of 353 French companies based on

estimating the discretionary component of accruals and finding a decrease in earnings management after IFRS adoption (Zéghal, 2011). Barth et al. have the same results in approving the improvements on earnings quality – using earnings management decline as the proxy - using a sample of companies that adopted IFRS between 1994 till 2003 from 21 different countries (Mary E. Barth, 2008). Navarro-Garcia et al. also confirm the improvements and decline in earnings management following the IFRS adoption using the sample of German quoted companies (Navarro-Garcia, 2014).

Contrary to the abovementioned research, Doukakis evaluated the effect of mandatory IFRS adoption in the European Union on accrual and real earnings management using a sample of 1,502 observations from 22 EU countries between 2000 and 2010. They concluded that the adoption had no significant impact on the level of earnings management (Doukakis, 2014). Capkun et al. examined early, late, and mandatory IFRS adopters using a sample of firms corresponding with Barth et al. research. They specify the greater flexibility and significant judgmental space for managers in the overall set of standards because the companies could increase earnings management (Capkun, 2016).

Narrowing down the research about IFRS adoption and the impact on earnings quality of the banking sector (Anandarajan, 2011; Gebhardt, 2011), Anandrajan et al. and Gebhardt et al. examined the European Union banking sector, and these two pieces of research both agreed on the improvement of earnings quality after IFRS adoption. Anandrajan et al. specified that since the new standard on loan loss provisions limited the available options, it has restricted the managers' discretion and improved earnings quality by reducing the extent of earnings management (Anandarajan, 2011). However, Gebhardt. et al. emphasized reporting incentives of the banks and benchmarked their results with the US banking industry as there is no such similar decrease in income smoothing in the US since the loan loss requirements are different as per FASB standards (Gebhardt, 2011).

1.3.2 IFRS 9: Financial instruments – Classification of financial assets

The International Accounting Standards Board applied IAS 39 Financial Instruments: Recognition and Measurement in April 2001, which the International Accounting Standards Committee had initially issued in March 1999, guides the treatment on loan loss provision and introduces new classification and presentation requirements for financial assets. The Board intended to improve

the accounting treatment (IFRS, 2003). The replacing standard defines and specifies the requirements for the classification and measurement of financial assets while still allowing the entities to apply IAS39 for hedge accounting treatments. The significant changes can be illustrated as below:

Items	*IAS 39*	*IFRS 9*
Initial measurement	Held for trading – at fair value Held to maturity – Amortized cost	Fair Value
Classification Types	Financial assets at fair value through profit or loss Financial assets held to maturity Loans and receivables Financial assets available-for-sale	Financial assets valued at amortized costs Financial assets valued at fair value through other comprehensive income Financial assets valued at fair value through other profit or loss
Classification metrics	The purpose for which the assets are bought and held	a) Business model test b) Solely payments of principal and interest
Measurement	Fair Value or Cost method Held to maturity investments are measured using amortized costs	Amortized Cost Fair Value

Table 2:Illustration of differences between IAS 39 and IFRS 9

According to the new standard, financial assets have to be categorized in three categories after initial measurement according to the business model test:

1. *Financial assets measured at amortized costs*: If an asset is held to collect contractual cash flows (Business model test) in the form of solely payments of interest and principal, the asset is classified and measured at amortized costs.
2. *Financial assets measured at fair value through other comprehensive income*: If the financial asset is held to collect contractual cash flows and sell, then the asset is measured at FVTOCI.
3. *Financial assets measured at fair value through profit or loss*: IF the asset is not categorized at any of the above two categories, it should be classified as FVTPL, which means that either the business model test is not passed or the intention is not to collect payments of principals and interest solely. Nevertheless, the company can make an irrecoverable election at the initial recognition of any financial asset to be measured at FVTPL.

According to the new IFRS 9 requirements, the impairment recognition is only for the financial assets measured at amortized cost and FVTOCI as the loss in the value of assets measured at FVTPL forms as part of the revaluation of the asset through P/L, which is not aggregated and specified in the scope of loss allowance.

1.3.3. Differences between IFRS 9 and IAS 38 in loan loss provision models

At the issuance of IFRS 9 *Financial Instruments* in July 2014, the Board announced the replacing impairment requirements for an entity's expected credit losses accounting on its financial assets and commitments to extend credit, which alternates the former treatment in IAS 39. The mandatory application of such treatment took place on 1 January 2018. FASB also amended the requirements for credit loss impairment in 2016, applying the expected credit loss model, but the model applied is not a three-stage model, unlike IFRS 9. The new impairment model for financial assets consists of three stages:

Stage 1: After initial recognition: 12-month expected credit losses are recognized in profit or loss, and a loss allowance is established based on initial expectations of credit losses. They are supposed to be calculated by multiplying the probability of a default occurring on the instrument in the next twelve months by the lifetime expected credit losses that would result from that default. For financial assets, interest revenue has to be measured on the gross carrying amount.

Stage 2: Significant increase in credit risk: If the credit risk increases significantly, full lifetime expected credit losses are recognized in profit or loss. The calculation of interest revenue is the same as for Stage 1.

Stage 3: Credit-impaired level: If the credit risk of a financial asset increases to the point that it is considered credit-impaired, interest revenue is calculated based on the amortized cost. Financial assets in this stage will generally be assessed individually. Lifetime expected credit losses are recognized on these financial assets.

Stages	*Status*	*Accounting treatment*
Stage 1	Initial recognition	12-month expected credit losses on allowance
Stage 2	Significant increase in credit risk	Lifetime expected credit losses (weighted average with the possibility of the default) on allowance
Stage 3	Credit-impaired level	Lifetime expected credit losses on the net carrying amount

Table 3: Illustration of three steps of impairment in the Expected Credit Loss Model

Credit losses are defined as the difference between all the contractual cash flows due to be received and the cash flows that it expects to receive, which are discounted at the original effective interest rate (Arta Limani, 2017).

IFRS 9 explains that changes in credit risk are assessed based on changes in the risk of a default occurring over the expected life of the financial instrument (Arta Limani, 2017). However, At stage 2 or 3, it is possible to revert to 12-month expected credit losses if the credit risk of the instrument subsequently improves. The three-stage impairment treatments are applied as a single impairment model to all financial instruments, including all loan commitments, while IAS 39 had different models for different financial instruments.

As per IAS 39 requirements, the amount of impairment is recognized based on evidence of the present condition. IAS 39 allows only the provision of incurred losses assessing the loan balances both individually and collectively (if individually not significant). Ultimately, after excluding any

non-repayable as net charge-offs, the balance of the allowance for credit loss is therefore adjusted periodically as below:

$$\text{ALLOWANCE}_t = \text{ALLOWANCE}_{t-1} + \text{LOSS}_t - \text{NCO}_t + \text{Other}_t \quad (3)$$

On the other hand, the Expected Loss Model measures the required balance based on the weighted average probability of default over the next 12-months (stage 1) or the lifetime (stage 2) for a significant increase in credit risk. After the initial recognition, the periodical adjustments would be as below:

$$\text{ALLOWANCE}_0 = \sum_{t=1}^{N} (\text{Probability of Default}_t(I_0) \times \frac{\text{Lifetime Gross Default}_t(I_0)}{(1 + \text{Discout rate})^t}) \quad (4)$$

It is important to note that the new provisioning is only applicable to financial assets recognized either at amortized or fair value through other comprehensive income. Assessing to see which stage of credit impairment the loan is standing at the period ending, redoing the formula gives the new required balance of loan loss provision. Adding the effect of the unwinding discount $(\text{LLA}_{t-1} \times \text{dr})$ and after the exclusion of significant impaired amounts, the balance forms as below:

$$\text{LLA}_t = \text{LLA}_{t-1} + \text{LLA}_{t-1} \times \text{dr} - \text{STAGE3}_t + \text{Other}_t \quad (5)$$

Under the impairment requirements in IAS 39, the recognition of such loss was subject to objective evidence considering only past conditions and current events to determine the amount. In contrast, in ECLM, the impairment losses are recognized initially and at each subsequent reporting period, even if it has not yet incurred. It requires managers to base their periodic estimates of credit loss provisions on loss history and current situation and forward-looking information about future expectations and conditions. It is also suggested that the banks assess impairment losses on a portfolio basis when evaluating credit risk for each separate customer may not be possible (Arta Limani, 2017).

Gomma et al. state that the problem with the Incurred Loss model during the financial crisis was recognizing much lower loss than it was expected to affect the entities, but it is advantageous over the expected credit loss model in terms of income smoothing. Since the managers must exercise

more judgment, they are more open to exercise discretion over such accounts. Using a controlled library environment and surveying 63 managers with different compensation schemes in this simulation, applying the simplified ECLM, the participants were not just making decisions based on their schemes but also maximizing the hypothetical firm's profitability. Even though the compensation schemes had a significant impact on the allowance balance, additional information about future expected events reduced the level of earnings management applied after applying ECLM. However, overall, the extent of managed earnings in this studied behavioral simulation increased after ECLM once the limitation for loan loss reserving was waived (Mohamed Gomaa, 2018).

1.4. Research goals

1.4.1. Post-IFRS 9 level of earnings management in the banking sector

The International Financial Reporting Standards foundation aims to improve financial reporting by setting and updating its accounting and reporting standards. As Healy studied the implications of earnings manipulation on standard setters, he mentioned an essential question. It decides how much managers can exercise judgment in financial reporting, which brings an interest in knowledge and evidence on the magnitude, frequency, specific accruals, accounting methods, and motives for earnings management (Healy, 1999). The same argument is in place about the IFRS foundation, which has to realize whether the replacing treatment would enhance the quality of reporting or not. As there is a higher capacity given to the managers in IFRS 9, it is expected to increase earnings management through loan loss provision.

Several studies tried to testify the effectiveness of a particular issuance of acts and standards on the level of earnings management. Hossain et al. studied earnings management before and after passing the Sarbanes Oxley Act (SOX) in 2002. In the pre-SOX years, the sample of implicated firms managed abnormal accruals significantly higher than the matched group of non-implicated firms. Their result suggests that the effect of SOX on mitigating the level of accruals management is substantially more significant for the implicated companies than for the non-implicated companies. The difference in the effect of SOX persists even after controlling the differences in their governance and internal control effectiveness. They mention further that SOX had effects on management's reporting choices beyond those resulting from improvements in governance and internal control over financial reporting (Mahmud Hossain, 2010).

In contrast, research studies about the 1990 change in capital adequacy regulations have not found any evidence of changes in respect of earnings management via loan loss provision. However, in this study, it is strongly suggested that loan loss provisions are used for capital management (Anwer S. Ahmed C. T., 1999).

In a more specific context, Kilic, who studied the impact of SFAS 133 *Accounting for Derivative Instruments and Hedging Activities* - within US GAAP standards issued by FASB – states that mandatory recognition of hedge ineffectiveness, the ability of income smoothing through derivatives decreased. As a result, banks rely on loan loss provisions to answer the standard issuance's effectiveness if it results in more manipulations of loan loss provisions covered by SFAS 157 *Fair Value Measurement* (Emre Kilic, 2013).

Some researchers tried to figure out the material impact of the new standard (Mora, 2019; Mohamed Gomaa, 2018). Gomaa has studied the efficacy of shifting from the previous incurred loss model required by IAS 39 to the new expected credit loss model treatment in IFRS 9. His results on the controlled laboratory environment show that the ICL model's replacement with the ECL model facilitates high reserves. The resulting increased earnings management is less than predicted and does not offset the potential of the ECL model's positive effects. (Mohamed Gomaa, 2018) However, His studies have concluded such results based on a test-bed examination (a hypothetical firm) before the issuance of the new figures by companies affected by complying with IFRS 9 considering the simplified ECLM applicable for receivables in manufacturing companies, which does not reflect the actual post-application effect of the new model applied in the banking sector.

Nonetheless, several aspects also are considered by other researchers. in Mora's studies, after the examination of the features and differences between IAS 39 and IFRS 9 in respect of credit loss models, He states an expectation of an increase in unconditional conservatism as a result of shifting to the new standard. The author argues that earnings management may become an issue to the extent that impairment losses can be reversed, and the longer the loan investments remain in the bank's balance sheet, the larger the problem. However, Mora has not examined his ideas by modeling or measuring earnings management to provide econometric evidence (Mora, 2019).

There is an opportunity to research the actual effect of IFRS 9 replacing the loan loss model since the figures of most of the banks have already been adjusted and applied the treatment. For this purpose, using an appropriate model of earnings management detection, it is possible to

compare the results with pre-IFRS9 figures and make a conclusion based on actual figures. The research that examined the adoption of IFRS standards in different banking and non-banking sections is quite valuable for examining this recent change in the standards that are not referred to or pointed out by any of the studies about the impact of ECLM.

1.4.2. Post-IFRS 9 Loan Loss Provisioning and capital management

There is no research examining the ECLM impact on capital management within the banking sector. Neither Mora et al. nor Gomma et al. pointed out the possible effect of the new expected credit loss model on capital management as neither of these researches has focused on the banking sector (Mora, 2019; Mohamed Gomaa, 2018). However, several papers examined the changes in capital adequacy requirements and the effects on capital management. Anandrajan et al. tried to figure out the respective impact of the IFRS adoption on capital adequacy ratios alongside earnings management, and they could not find sufficient evidence of capital management before and after IFRS adoption (Anandarajan, 2011).

1.5. Hypothesis Development

Healy studied the implications of earnings manipulation on standard setters, and he mentioned an essential question for standard setters. It decides how much management can exercise judgment in financial reporting, which brings an interest in knowledge and evidence on the magnitude, frequency, specific accruals, accounting methods, and motives for earnings management (Healy, 1999). The extent of applied earnings management may reflect excessive allowed judgment to exercise discretion on the performance figures. Therefore, it is crucial to perceive the propriety of the new required treatment for impairment of financial assets. Having more income smoothing can reflect the dysfunctionality of recent standard developments on earnings quality. The EU Commission evaluated ten years of mandatory IFRS adoption in 2015, seeking stakeholders' views. It evaluates the overall results satisfying. However, it emphasized the need to review the quality of implemented standards regularly.

Examining member countries of the European Union will also increase the need to consider the cross-country determinations effectively dominating the extent of earnings management. Subsequently, the change in the IFRS standard may have been differently affected by the companies in distinct regulatory and economic environments. Investor protection, disclosure

requirements, regulation and supervision, financial structure, and financial development of each specific country are factors that can affect the income smoothing of the banks (Ana Rosa Fonseca, 2008). It is vital to realize how banks among the EU countries reacted to the new treatment in earnings management comparably. As EY analysis shows the contrasting impact of the new model, there has been a significant increase in Italy's loan allowances, while in Germany, it resulted in a decrease of 1b EUR in total for most banks (Laure Guegan, 2018).

Public and private banks may react dissimilarly in applying the new ECLM treatment, raising the question of how it affects the quality of listed and unlisted banks' earnings. Prior research shows higher management incentives to earnings manipulation in public banks than private ones (Anne L. Beatty, 2002). However, in applying and implementing a forward-looking model, public banks may have better infrastructures to maintain the reporting quality than private banks. Therefore, it is necessary to limit the research to public banks or examine whether the private banks have different earnings management levels as the reporting incentives and regulatory obligations differ.

Moreover, since the earnings management within the banking sector is often connected to the capital-required reserve, it interrogates the capital management issue. Having a contradictory effect against regulatory capital incentives, the extent of earnings management does not significantly determine loan loss provisioning (Anwer S. Ahmed C. T., 1999). The EU Basel III new Capital Adequacy rule has several differences to the previous Basel II framework in terms of requirements of the banks to set aside capital reserves relative to Tier 1 core capital and Tier 2 supplementary capital in order to maintain the bank's financial operations in the event of experiencing a significant loss. The Basel III implementation is in place from January 2019; however, there is no change in Capital Adequacy regulations to be taken into account for this research. However, capital restriction, balanced liquidity, and leverage requirements may motivate the managers, especially distressed banks, to manipulate earnings figures by reducing loan loss provision.

1.5.1. ECLM overall impact on the extent of earnings management

There are contradictory findings of the effect of IFRS adoption on earnings management. Several authors agree with the improvements in earnings quality (Mary E. Barth, 2008; Daniel Zéghal, 2011; Anandarajan, 2011; Gebhardt, 2011), while some other authors disagree and disregarding the improvements (Vedran Capkun, 2016; Anwer S. Ahmed M. N., 2013) and state the increase

in income smoothing following the IFRS adoption, or no significant effect on real and accrual earnings management (Doukakis, 2014). Trimble criticizes that such opposing findings result from measurement issues using discretionary accruals models, lack of post-adoption data, other significant regulatory changes in 2005, and most common focus of such research developed countries (Trimble, 2018). However, such an argument is acceptable, primarily for non-financial firms, regarding the measurement and methodology. The two outstanding pieces of research covering the banking industry in the European Union on the resulting improvements in accounting quality following the IFRS adoption (Anandarajan, 2011; Gebhardt, 2011) while focusing on the general application of IFRS in these financial firms, both of these researches narrow down to the most relevant element of income smoothing in the banking industry, which is the loan loss provisioning. The primary standard involved the appropriate accounting treatment was IAS 39 required the banks to use the incurred loss model. Gebhart et al. mentioned that shifting from the former GAAP Expected loss model and other similar provisioning methods that European banks used to apply (e.g., fair value accounting, dynamic LLP) to the incurred loss model resulted in improved accounting quality (Gebhardt, 2011). Switching to a model with the exact nature of recognition will turn the situation back to the incurred loss model's pre-application through IFRS adoption. Moreover, the required new allowance is commonly higher than the previous model due to the significant management judgment (Laure Guegan, 2018; Mohamed Gomaa, 2018). Therefore, hypothetically, the expectation is to have increased earnings management after the ECLM application.

H1: The earnings management within EU banks using Loan Loss Provision has increased after the Expected Credit Loss Model application.

1.5.2. Regulatory capital disincentive within the EU banks after ECLM application

Most earnings management researchers within the banking sphere examine the regulatory capital factor simultaneously and the possibility of capital management. (Mora, 2019; Anandarajan, 2011; Gebhardt, 2011; Anwer S. Ahmed C. T., 1999; Collins, 1995; Anne Beatty, 1995; Beaver, 1989; Kim, 1998). Capital management behavior can be immaterial in the context of the examination of IFRS adoption (Anandarajan, 2011) or adjustable by assigning control variables in the cross-country study (Ana Rosa Fonseca, 2008). However, Ahmed et al. point out capital management as an essential determinant of banks' earnings management following the capital regulation reform in

1990. (Anwer S. Ahmed C. T., 1999) Having Basel III Tier 1 and Tier 2 minimum regulatory capital requirements for the EU banks, as financially distressed banks can be under pressure to maintain the reserve via income smoothing, made even the distressed banks over the extent of their income smoothing (Anandarajan, 2011). Historical studies prove the fact about the state of financial crisis within banks. Cohen et al. show that in the context of the financial crisis's significant impact in 2007, the association of earnings management with downside risks in banks is significant even though they could not find proper evidence for capital management (Lee J. Cohen, 2014). Most of the abovementioned studies used the banks filed with US Federal Reserve. After introducing the Basel framework, the results show that the banks were not involved with capital management behavior via loan loss provisions as discretionary.

Anandrajan et al. point out the need to limit managerial discretion by accounting standards to avoid defection in earnings and capital quality through capital management, which is a viewpoint of Barth et al. studies (Anandarajan, 2011; Mary E. Barth, 2008). Nonetheless, Anandrajan et al. could not provide sufficient evidence on capital management as the provided model did not reflect significant coefficients with regulatory capital variables.

Since the model is considered to be a turn to the former EU GAAP provisioning systems, which were less prudent and loose compared to IAS 39 Incurred Loss model under the first hypothesis; such banks may find a way to maintain their capital management behavior after the changes in IFRS standard treatments since there is more allowed judgment under the new requirements. In other words, the new IFRS has not reduced the possible extent of capital management after implementing the new provisioning model. Even though most of the studies could not at least provide evidence on capital management after changes in loan loss provisioning rules following by IFRS mandatory adoption, additionally given discretion to managers (Mohamed Gomaa, 2018) , the hypothesis would be as below:

H2: The capital management within EU banks using Loan Loss Provision has increased after the Expected Credit Loss Model application.

1.6. Managerial Implications of the research

This new model's announcement concerned most analysts and managers about the implication and usefulness of such a thing. While regulatory bodies and standard setters having different interests,

they can find it challenging to align, respectively. Banks prefer having flexible accounting treatments while the regulators aim to have transparency, accurate, and fair reporting. Perhaps this research can shed light on the impacted quality of providing information. In case of finding more income smoothing patterns, shareholders and board members can see the need to have more restrictions and internal guidelines on the extent of applied managerial judgment in this aspect if no clear external guidance is in place. Many banks reported struggling with the implementation of the new IFRS 9 requirements. To overcome such challenges, the banks must restructure their business model in IT and risk management areas. They need to know the required infrastructure to overcome possible violations and misrepresentations.

1.7. Expected Challenges and Limitations

Due to the new model's complicated issues, there might be several challenges in studying the topic. IFRS 9 includes, in addition to the ECL model, two other standards: classification and measurement and a new hedge accounting model. It is challenging to isolate each standard's consequence separately as, for instance, IFRS 15 Revenue from contracts with costumers is also in place from 1 January 2018 (Mora, 2019). The choice of independent variables that specifies the accruals' non-discretionary element is different from the previous research. However, according to the assumption, the chosen variables should not have any discretionary nature, challenging to build a fit model with the least omitted variables. This research's primary assumption is that all the entities apply the new model with the same approach. Practically, it is not the case. Companies may cope with the adoption of the new model differently. The interaction between IFRS and other regulations (e.g., Basel framework) also makes it challenging to form a proper empirical methodology. Narrowing the research helps ignore the possibility of having other managerial incentives for earnings smoothing to affect the results. Nevertheless, endogeneity issues are primarily associated with empirical researches in earnings management studies. We have more variables reducing the degree of freedom, which may cause a less reliable equation.

Several factors not related to the ECL approach had a significant impact on transition, such as reclassifications, write-off policies, and the treatment of purchased and originated credit-impaired (POCI) loans (Arta Limani, 2017). These drivers and their complex interactions can make it difficult to understand and illustrate earnings management's impact.

Chapter 2: Research Design and Methodology

2.1. Methods to detect earnings management through LLP in the banking sector

In order to be able to examine the effect of applying the issued IFRS 9 standard expected credit loss model on the amount of the managed earnings in the banking sector through loan loss provision, comparing to the IAS 39 Incurred loss model, the appropriate methodology has to be considered to reach the needed results which mostly performed on cross-sectional data.

As per the most classic earnings management models, the total accruals are sub-divided into discretionary and non-discretionary components using a two-step model (TA is total accruals), total LLP, and DA is the discretionary component NDA is a non-discretionary component). Moreover, applying the residuals from the first model as a non-discretionary component and modeling it with hypothesis variables would evaluate the impact of the second model's measured earnings management.

$$TA = DA + NDA$$
$$DA = TA - NDA \quad (6)$$

Beaver and Engel developed a specific model in which the estimated residual allowance for loan losses has been considered the discretionary accrual proxy. In this model, the non-discretionary component is specified as a dependent variable to independent variables, including the net charge–offs (CO), loans outstanding (LOAN), non-performing assets (NPA), and changes in the non-performing asset (ΔNPA) in one year ahead (William H. Beaver, 1996):

$$NALL_{it} = \alpha_{it} + \beta_1 CO_{it} + \beta_2 LOAN_{it} + \beta_3 NPA_{it} + \beta_4 \Delta NPA_{it+1} + u_{it} \quad (7)$$

Therefore, as a result, the residual from the equation (z_{it}) is considered as an estimate of DALL. The model assumes there is no discretionary component to the conditioning variables:

$$ALL_{it} = \alpha_{it} + \beta_1 CO_{it} + \beta_2 LOAN_{it} + \beta_3 NPA_{it} + \beta_4 \Delta NPA_{it+1} + z_{it} \quad (8)$$

$$z_{it} = DALL_{it} + u_{it} \quad (9)$$

Beatty et al. used the following regression to estimate the non-discretionary component of loan loss provision among the public and private banks (Anne L. Beatty, 2002):

$$LOSS_{it} = \alpha_{it} + \beta_1 LASSET_{it} + \beta_2 \Delta NPL_{it} + \beta_3 LLR_{it} + \beta_5 LOANR_{it} + \beta_6 LOANC_{it} + \beta_7 LOAND_{it} + \beta_8 LOANA_{it} + \beta_9 LOANI_{it} + \beta_{10} LOANRF_{it} + \varepsilon_{it} \quad (10)$$

ΔNPL is the change in non-performing loans as a percentage of the average total loans, and LLR is formulated as loan loss reserve as a percentage of the average loans. Other variables are introduced by Beatty et al. to have portions of different types of loans in place.

However, due to aimed EU cross-country projected study in this research, additional variable(s) to the traditional model should be incorporated to control for the capital-management hypothesis (states that bank managers use LLP to reduce expected regulatory costs associated with violating capital requirements) and country dummies for differences in the level of LLP across countries. (Ana Rosa Fonseca, 2008). Considering the most relevant research in modeling, which evaluates the effect of mandatory IFRS adoption in the European Union, Anandrajan et al. formulated the following one-step model (Anandarajan, 2011):

$$\begin{aligned} LLPR_{it} = {} & \beta_0 + \beta_1 LOANS_{it} + \beta_2 \Delta NPL_{it} + \beta_3 NPL_{it} + \beta_4 \Delta LOANS_{it} \\ & + \beta_5 RegCap_{it} + \beta_6 EBTLLP_{it} + \beta_8 LISTED + \beta_9 ECLM \\ & + \beta_9 ECLM \times RegCap + \beta_{10} ECLM \times EBTLLP \\ & + \beta_{11} ECLM \times EBTLLP \times Dz + \beta_{12} ECLM \times COUNTRY \\ & + \beta_{13} Dz \times RegCap + \beta_{14} Dz \times RegCap \times ECLM \\ & + \sum Company\ fixed\ effect + \sum Period\ fixed\ effect + \varepsilon_{it} \end{aligned} \quad (11)$$

LLPR is the ratio of loan loss reserve over total loans. The Z-score metric for bank insolvency developed by Boyd et al. (Boyd, 1993) as a low z-score indicates high insolvency risk.

In this model, in addition to the loan balance and changes in loans (defined in the form of ratios), RegCap is taking the regulatory capital, and COUNTRY consists of several variables that can determine the country's effects. A higher association of LLP with earnings after the new model would reflect lower earnings management. The binary variable of ECLM for the figures presented using the new expected credit loss model presents the respective measure of impact. Also, a dummy variable for being below z-score for financially distressed companies gives the model additional functionality to evaluate the ECLM.

A higher association of LLP with earnings after the new model would reflect higher exposure to earnings management. Also, a dummy variable for being below z-score for financially distressed companies gives additional functionality to the model to evaluate the ECLM.

Like this model, Kilic et al. used a similar one-step approach to examine the impact of implementing the SFAS 133 Accounting standard for derivative instruments and hedging activities in the US commercial banks for affected banks. He deflated LLP as a dependent variable and a binary variable to indicate pre and post SFAS observations. Non-discretionary component variables contained allowance, charge-offs, non-performing loans, and total gross loans similar to Anandrajan et al. (Emre Kilic, 2013)

2.2. Measuring the impact of the ECLM model on banks' earnings

Even though using models similar to examination models of IFRS adoption effect is most relevant to this research, it can still be challenging to isolate a specific change in standard, which is, in this case, the replacing expected credit loss model. On the same effective date, several other modifications have been taken in place.

The figures required for the estimation of non-discretionary components can be collected from the financial statement figures. For examining the effect of applying the ECLM in the EU banks, panel data must be gathered from periods before and after the transition date. Nevertheless, an optimum model will be reached after examining all elements and econometric procedures by having comprehensive, relevant variables.

Depending on the data availability and the research subject, other explanatory variables can be defined instead of distinction between different types of loans. Anwer et al. used non-performing loans, the implied standard deviation of bank assets values, and the change in business failures in a bank's market as three variables for the non-discretionary component. The implied standard deviation of banks' asset values represents a stock market-based estimate of the risk inherent in banks' loan portfolios. However, his methodology was aimed not only to document earnings management but also to provide evidence on capital management (Anwer S. Ahmed C. T., 1999).

2.3. Cross-country factors affecting earnings management through LLP in banks

There are additional variables to the traditional model incorporated by Fonseca to analyze the procyclicality of bank provisioning when it comes to cross-country determination, including lags of the banks' loan loss provisions. Additionally, he presumed bank capital to control for the capital-

management hypothesis (states that bank managers use LLP to reduce expected regulatory costs associated with violating capital requirements) and country dummies to control for differences in LLP levels across countries. However, unlike the abovementioned model, in this research, the loan loss reserve is considered as the non-discretionary component instead of LLP (Ana Rosa Fonseca, 2008). Nevertheless, by having comprehensive, relevant variables in place, an optimum model will be reached after examining all variables and econometric procedures. Madeline conducted intensive research on the global IFRS adaptation effect on accounting quality within non-financial firms resembling the similar impact of improvement for EU and non-EU sectors without cross-country proxies.

Consequently, no specific comparison was made between the results of different countries (Trimble, 2018). Overall, since all the EU countries are somehow in a similar legal and economic context as a single continent, such country dummies can also be ignored for this research. The inclusion of bank-specific and country-specific dummies together in a model would lead to aliased variables.

2.4. Research Methodology

This research aims to determine the possible effect of the transition to ECLM within the EU public and private banks in the European Union using a relevant EM detection model. These figures are collectible from 137 EU institutional banks that applied IFRS (either mandatory or voluntary) and the required transition from the effective date of 1 January 2018.

Like other research in this sphere, as this research will scrutinize the new loan loss model's actual impact, the study will be experimental. For this purpose, a representative model is applicable. As per the most classic earnings management models, the total accruals are sub-divided into discretionary and non-discretionary components (TA is total accruals), total LLP, DA is the discretionary component, NDA is a non-discretionary component). The overall examination of the hypothesis can be done by applying both two-step and one-step methods. The two-step methodology process is as below:

Step 1: Measure the discretionary component of the loan loss provisions

Step 2: Evaluate the significance and effect of target variables on the discretionary component

Similar to Anandrajan et al. relevant research in modeling the LLP but applying the discretionary component as the dependent variable (Anandarajan, 2011; Beaver, 1989; Anne Beatty, 1995; Emre Kilic, 2013), we can formulate the relevant two-step and one-step model variables as below:

$$NLLP_{it} = \alpha_{it} + \beta_1 LOANS_{it} + \beta_2 \Delta LOANS_{it} + \beta_3 NPL_{it} + \beta_4 \Delta NPL_{it} + \sum Company\ fixed\ effect + u_{it} \quad (12)$$

$$u_{it} = DLLP_{it} + \varepsilon_{it} \quad (13)$$

$$DLLP_{it} = \beta_0 + \beta_5 RegCap_{it} + \beta_6 ROA_{it} + \beta_7 ECLM_{it} + \beta_8 ECLM_{it} \times RegCap_{it} + \beta_9 ECLM_{it} \times ROA_{it} + \varepsilon_{it} \quad (14)$$

Instead of having the two-step methodology, the whole model can also be defined in one stage by defining discretionary and non-discretionary components all in one linear model as below:

$$LLP_{it} = \alpha_{it} + \beta_1 LOANS_{it} + \beta_2 \Delta LOANS_{it} + \beta_3 NPL_{it} + \beta_4 \Delta NPL_{it} + \beta_5 RegCap_{it} + \beta_6 ROA_{it} + +\beta_7 ECLM_{it} + \beta_8 ECLM_{it} \times RegCap_{it} + \beta_9 ECLM_{it} \times ROA_{it} + \sum Company\ fixed\ effect + u_{it} \quad (15)$$

For validation, we can testify and implement both one-step and two-step models. There is also a possibility of considering the absolute value of residuals from the first step and then testifying the discretionary component regardless of the coefficients' signs. There are several changes to the single-stage model that Anandarajan et al. have applied in their research. We have developed the two-stage model same variables defined in Beatty et al. research to exclude the remeasurement and reclassification effects of the IFRS 9 application and include a proxy for non-discretionary component banks provisioning in the form of changes in the gross loan. LLP is usually a variable consist of loan loss provision divided by the average total assets ratio. ΔNPL is the change in non-performing loans, which can also be presented as a percentage of change since ratios are applied for the other variables. NPL is the balance of non-performing loans, and ΔLOANS is the changes in gross loans. Two of these variables may be removed to reach a non-discretionary variable. RegCap is the Tier 1 Capital Adequacy ratio, which divides the common stock and retained

earnings by risk-weighted assets. There is no need to adjust the capital figure for allowance since the Basel II, and III required calculations do not include this figure as part of the ratio's nominator.

LLP	Loan loss provision deflated by the opening balance of total assets
NLLP	Loan loss provisions divided by average total loans (or deflated by the beginning balance of the loan) – Non-discretionary component
DLLP	Residuals from the first step non-discretionary model – Discretionary component
LOANS	Total gross loans balance divided by opening total assets
ΔLOANS	Changes in the gross loans divided by the total opening assets
ΔNPL	Changes in non-performing loans (diff or lag variable)
NPL	Non-performing loans divided by the total opening assets
RegCap	Tier 1 or Tier 2 (Adjusted) Capital Adequacy ratios (lagged)
ROA	Earnings before tax and loan loss provisions divided by the average total assets
ECLM	A binary variable for application of Expected Credit Loss Model 1 for observations after 31 December 2017 and 0 for all dates before this effective date.

Table 4: Illustration of Equation (15) variables

There are several changes to the single-stage model that Anandarajan et al. have applied in their research. We have developed the two-stage model same variables defined in Beatty et al. research to exclude the remeasurement and reclassification effects of the IFRS 9 application and include a proxy for non-discretionary component banks provisioning in the form of changes in the gross loan. LLP is usually a variable consist of loan loss provision divided by the average total assets ratio. ΔNPL is the change in non-performing loans, which can also be presented as a percentage of change since ratios are applied for the other variables. NPL is the balance of non-performing loans, and ΔLOANS is the changes in gross loans. Two of these variables may be removed to reach a non-discretionary variable. RegCap is the Tier 1 Capital Adequacy ratio, which divides the common stock and retained earnings by risk-weighted assets. There is no need to adjust the capital figure for allowance since the Basel II, and III required calculations do not include this figure as part of the ratio's nominator.

Coefficient	*Expected sign*	*Significance*	*Measure*
β_1	+	Determinant on overall LLP figure within the banking sector	Gross loans balance as non-discretionary component
β_2	+	Determinant on overall LLP figure within the banking sector	Changes in loans balance as a non-discretionary component
β_3	+	Determinant on overall LLP figure within the banking sector	Changes in non-performing loans as a non-discretionary component
β_4	+	Determinant on overall LLP figure within the banking sector	Non-performing loans as a non-discretionary component
β_5	+ / -	Determinant on overall LLP figure within the banking sector	Application of capital management
β_6	+ / -	Overall extend of exposed earnings management	Application of earnings management
β_7	+	The overall significance of ECLM on provisioning	The overall impact of ECLM on LLP
β_8	+ / -	Increase relationship after IFRS 9 comparing with β_5	Post-IFRS 9 difference in applying LLP for capital management (H2)
β_9	+ / -	Increased relationship after IFR9 comparing with β_6	Impact of ECLM application on the extent of managed earnings (H1)

Table 5: Illustration of Equation (15) coefficients

In this model, in addition to the loan balance and changes in loans (defined in the form of ratios), RegCap is taking the regulatory capital, and country dummies consist of several variables that can determine the country's effects. *A higher (lower) association of DLLP with the interaction of earnings (ROA) with ECLM comparing to the significance of the coefficient with ROA in the second model would reflect an increase (decrease) in earnings management.* The interaction term of ECLM with RegCap is a binary variable that captures the effect of applying the new loan loss provisioning treatment on capital management. *A significant coefficient comparing to the RegCap without interaction term will illustrate more aggressive capital management.*

The logarithm of lagged total assets is not included as part of the model because assets deflate all the variables, and such inclusion will lead to multicollinearity. The projected model initially also included the deflated allowance similar to Kilic et al. (Emre Kilic, 2013) as part of non-discretionary component variables. However, due to the high VIF value and high pairwise correlation with some other independent variables, such as non-performing loans, we excluded this variable from the model.

Within the illustrated model, the coefficient of LOANS is expected to be positive since the loan loss provision figure usually increases once the loan figures increases and vice versa. The same is applied on coefficients with ΔLOANS, NPL, and ΔNPL since the loan loss provision would logically increase (decrease) as these figures respectively increase (decrease).

Moreover, following the professional reports (Mora, 2019; Mohamed Gomaa, 2018; Laure Guegan, 2018) and overall geographic comparison of pre and post-IFRS9 adoption data, there has been an overall increase in allowance and provisioning figures. Therefore, the coefficient of the ECLM variable is expected to be positive and significant. As per related studies in capital management, since the increase in loan loss provisioning will reduce Tier 1 ratio, the expected sign of the coefficient with RegCap would be negative if we use Tier 1. On the other hand, Tier 2 ratio, the nominator can include allowance up to the maximum of 1.25% of risk-weighted assets. Therefore, we expect to have a positive coefficient in the normal situation since the increase in provisioning would increase the Tier 2 ratio.

Referring to the EBA report on the estimated effect of IFRS 9 on capital adequacy ratios, European Banking Authority states that the quantitative impact of the IFRS 9 implementation would be negative (EBA, 2017). Therefore, we also expect to see a negative coefficient with the interaction term of ECLM with RegCap. However, if the banks are involved in capital management, the coefficient can be significant and positive.

The figures required to estimate non-discretionary components are collectible from the financial statement figures; for examining the effect of applying the ECLM in the EU banks, panel data from periods before and after the transition date suits the required sampling. Nevertheless, by having comprehensive data of relevant variables, an optimum model will be reached after examining all elements and econometric procedures. To resolve the possible endogeneity issue, adding other variables can improve the modeling.

There are several ways to ensure the results' reliability and validity presented with the model in robustness tests. Anandarajan et al. made a sensitivity test by rerunning all equations, excluding periods with significant events. Moreover, the RegCap variable has been replaced with a Tier 2 capital adequacy variable to see if the same relation exists. Moreover, he segmentized his model to discretionary and non-discretionary components by adding changes in loan balance as the non-discretionary component (Anandarajan, 2011), which is already included within the proposed model in this research.

2.5. Data Collection

The data is collected using the Thomson Reuters platform. I used the database platform by filtering out the industry to the banking sector and the region to the European Union, limiting the observations to ultimate parents. I could generate 1,845 data observations from 88 listed ultimate parent European Union banks (excluding the United Kingdom) consisting of data observations in the Banking sector from 2015 till 2019. As we generated annual figures, since we had only 88 banks, the number of observations was not enough for the proposed methodology. We resolved the lack of observations by collecting the interim reporting figures from the same database so that the total observations reached an appropriate number. There were still missing values within the generated variables, mostly related to allowances (643 missing values) and non-performing loans (687 missing values). We used Bureau Van Djik BankFocus and the banks' public accessible reports to fulfill the missing parts. Moreover, we excluded governmental and non-commercial banks from the sample, and due to the low number of observations related to private banks, we decided to limit the observations to public banks

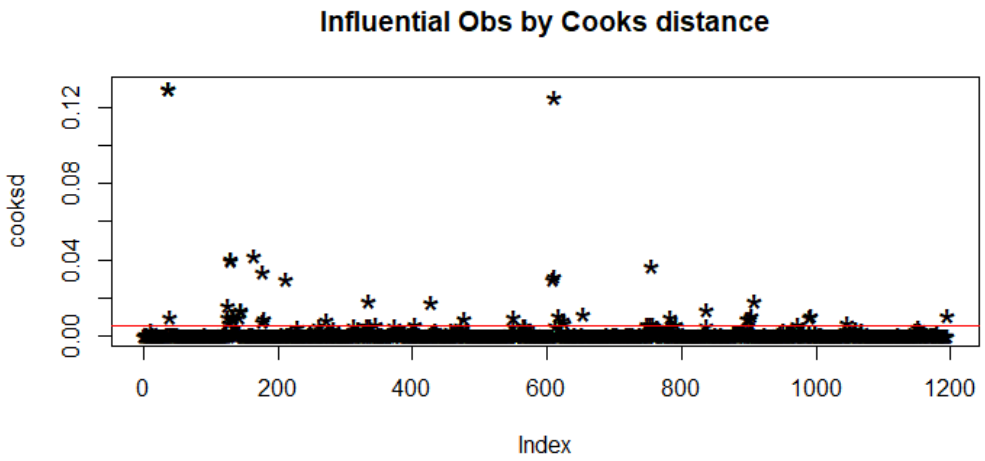
The net charge-off variable and the variables required for the estimation of the z-score were not readily achievable. Additional variables for excluding the balance of financial assets at FVTPL were not reachable through Thomson Reuters to adjust the figures accordingly. Therefore, unlike Anandrajan et al., we removed the hypothesis and the related z-score variable for distressed banks. Even though most of the researchers included net-charge offs as a non-discretionary component, due to the unavailability of such variable, only allowance, non-performing loans, gross loans, and changes in non-performing loans are the main proxies. Country and bank-specific dummies are also added to the model to maintain the non-discretionary component of the model. Overall, 1845 observations were reached, from which still some variables are missing. Such observations have

been automatically removed once we ran the model in R studio; even though there are methods to predict these missing values, we did not apply such methods.

There are two possible ways to handle the outliers in the data. One way is to remove them and the second way is to winosize. We used both of these methods. Firstly since there were many detected outliers for each variable, removing such outliers could result in a biased model. Therefore, instead of removal, we decided to winosize each variable to 1% and 99% quantiles. Afterward, there were still outliers that are not solely recognizable in each variable but the model as a whole. To remove the outliers, we used the model's cooks' distance method. Cook's distance is the estimated influence of each data point on the predicted value of the model. The value is calculated using the formula below:

$$D_i = \frac{\sum_{j=1}^{n}\left(Y_i - Y_{(j)i}\right)^2}{p \times MSE} \tag{16}$$

The value is calculated by the changes in the estimated dependent value with and without the observation. In this research, as a rule of thumb, the observations having Cooks distance values more than four times the mean are considered outliers due to significantly greater influence on the model than the other observations.



As per the scatterplot of the observations' cooks distance values, there are 37 values out of the initial dataset, which is above the threshold value. After removing the observations with missing

values, winosizing, and removing outliers, the observations reached 1,133, described in the following section.

2.6. Descriptive statistics and correlations

The finalized data sample contained banks from the European Union. There is no bank in the sample from Luxemburg and Switzerland as there was no data collectible about these banks from the EIKON Refinitiv database. Most of the data observations are related to the banks from Germany, Denmark, and Italy. The data sample has almost a fair number of observations from pre-and-post-IFRS9 application periods. There are 613 interim observations from June 2014 till December 2017. Fifty-nine observations are from 2014 have been used due to lagged variables in the model. Post IFRS 9 data includes 520 observation points that are from January 2018 till December 2020.

Countries	**Banks**
Austria	4
Belgium	2
Cyprus	2
Czech Republic	2
Denmark	10
Finland	4
France	9
Germany	10
Greece	2
Hungary	1
Ireland	3
Italy	17
Netherlands	3
Poland	6
Portugal	2
Slovakia	1
Slovenia	1
Spain	6
Sweden	3
Total	**88**

Table 6: Number of banks per European country in the collected data

Countries	2014	2015	2016	2017	Total
Austria	3	6	8	8	**25**
Belgium	2	4	4	4	**14**
Cyprus	0	0	0	1	**1**
Czech Republic	1	1	8	8	**18**
Denmark	9	23	30	32	**94**
Finland	4	11	15	15	**45**
France	6	12	12	11	**41**
Germany	7	16	21	23	**67**
Greece	0	0	0	6	**6**
Hungary	0	4	4	4	**12**
Ireland	0	6	5	5	**16**
Italy	7	23	29	26	**85**
Netherlands	0	5	7	8	**20**
Poland	8	22	24	21	**75**
Portugal	3	6	6	5	**20**
Spain	3	10	8	11	**32**
Sweden	6	12	12	12	**42**
Grand Total	**59**	**161**	**193**	**200**	**613**

Table 7: Number of observations per country for the periods before ECLM application

Countries	2018	2019	2020	Total
Austria	7	10	6	**23**
Belgium	5	5	1	**11**
Cyprus	2	2	3	**7**
Czech Republic	7	8	4	**19**
Denmark	27	26	22	**75**
Finland	15	15	12	**42**
France	17	7	0	**24**
Germany	22	17	7	**46**
Greece	8	8	4	**20**
Hungary	4	4	1	**9**
Ireland	6	6	2	**14**
Italy	26	27	9	**62**
Netherlands	8	7	3	**18**
Poland	24	21	7	**52**
Portugal	6	6	4	**16**
Slovakia	3	4	3	**10**
Slovenia	4	2	2	**8**
Spain	12	12	7	**31**
Sweden	12	12	9	**33**
Grand Total	**215**	**199**	**106**	**520**

Table 8: Number of observations per country for the periods before ECLM application

Statistics	LLP	LOANS	NPL	ΔNPL	ΔLOANS	ROA	ECLM	TIER1	TIER2	LLR
Minimun	-0.0010	0.3454	0.0006	-0.0047	-0.0314	0.0066	0.0000	0.0879	0.0000	-0.3324
Maximum	0.0021	0.9481	0.0735	0.0040	0.0394	0.0073	1.0000	0.2153	0.1399	0.0000
Range	0.0030	0.6027	0.0729	0.0087	0.0708	3.6043	1.0000	0.1274	0.1399	0.3324
Sum	0.8626	718.6278	36.5319	-0.7420	4.6404	0.0029	520.0000	177.3921	16.2094	-31.8199
Median	0.0006	0.6454	0.0223	-0.0003	0.0041	0.0032	0.0000	0.1515	0.0121	-0.0150
Mean	0.0008	0.6343	0.0322	-0.0007	0.0041	0.0001	0.4590	0.1566	0.0158	-0.0285
SE. Mean	0.0000	0.0046	0.0008	0.0001	0.0006	0.0001	0.0148	0.0009	0.0005	0.0011
CI. Mean	0.0000	0.0089	0.0015	0.0002	0.0011	0.0000	0.0291	0.0017	0.0009	0.0022
Variance	0.0000	0.0236	0.0007	0.0000	0.0004	0.0019	0.2485	0.0009	0.0002	0.0014
Std. Dev.	0.0008	0.1535	0.0263	0.0026	0.0197	0.5967	0.4985	0.0295	0.0147	0.0370
Coef. Var.	1.0475	0.2420	0.8151	-3.9650	4.8154	-0.0007	1.0862	0.1883	0.9279	-1.2988

Table 7: Descriptive statistics of the overall data sample

Statistics	LLP	LOANS	NPL	ΔNPL	ΔLOANS	ROA	TIER1	TIER2	LLR
Minimun	-0.00095	0.34540	0.00062	-0.00468	-0.03143	-0.00072	0.09051	0.00000	-0.18628
Maximum	0.00207	0.94811	0.07348	0.00400	0.03936	0.00656	0.21529	0.08764	0.00000
Range	0.00302	0.60270	0.07286	0.00869	0.07080	0.00728	0.12478	0.08764	0.18628
Sum	0.51204	381.34308	21.00984	-0.34269	2.03238	2.06865	92.89852	8.86772	-17.97251
Median	0.00061	0.63967	0.02276	-0.00033	0.00307	0.00314	0.14596	0.01268	-0.01692
Mean	0.00084	0.62209	0.03427	-0.00056	0.00332	0.00337	0.15155	0.01654	-0.03010
SE. Mean	0.00003	0.00637	0.00112	0.00011	0.00080	0.00008	0.00124	0.00065	0.00148
CI. Mean	0.00006	0.01251	0.00220	0.00021	0.00157	0.00016	0.00243	0.00127	0.00291
Variance	0.00000	0.02487	0.00077	0.00001	0.00039	0.00000	0.00094	0.00023	0.00131
Std. Dev.	0.00080	0.15771	0.02776	0.00264	0.01983	0.00200	0.03062	0.01501	0.03616
Coef. Var.	0.96267	0.25352	0.80981	-4.71710	5.98127	0.59257	0.20205	0.90701	-1.20098

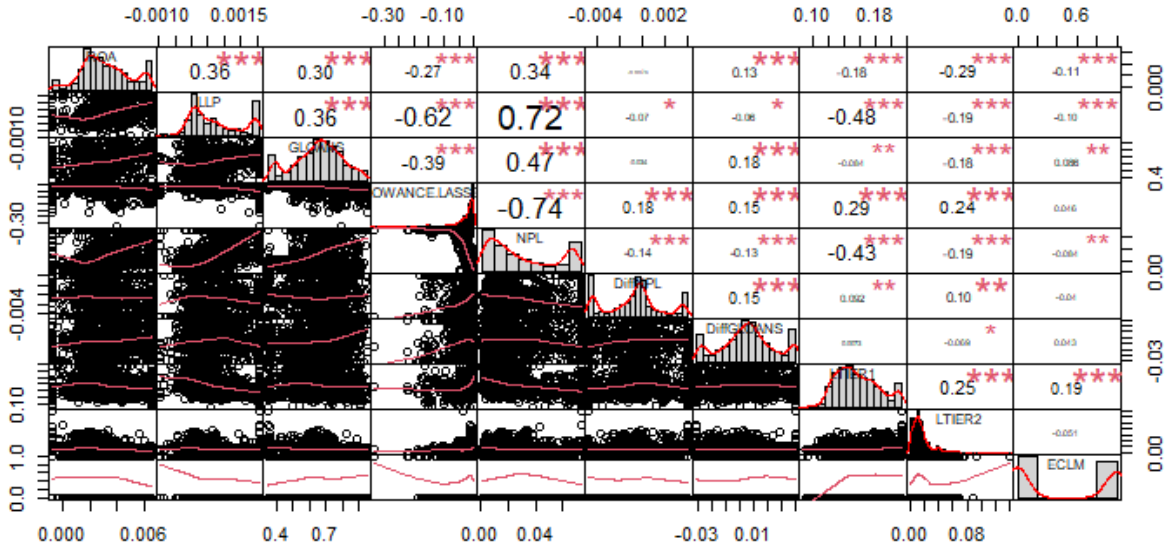
Table 8: Descriptive statistics of pre-IFRS9 observations

Statistics	LLP	LOANS	NPL	ΔNPL	ΔLOANS	ROA	TIER1	TIER2	LLR
Minimun	-0.00095	0.34540	0.00099	-0.00468	-0.03143	-0.00072	0.08787	0.00000	-0.33239
Maximum	0.00207	0.94811	0.07348	0.00400	0.03936	0.00656	0.21529	0.13989	-0.00094
Range	0.00302	0.60270	0.07249	0.00869	0.07080	0.00728	0.12742	0.13989	0.33145
Sum	0.35055	337.28473	15.52209	-0.39933	2.60799	1.53568	84.49354	7.34171	-13.84740
Median	0.00047	0.65032	0.02204	-0.00033	0.00588	0.00272	0.15702	0.01154	-0.01410
Mean	0.00067	0.64862	0.02985	-0.00077	0.00502	0.00295	0.16249	0.01504	-0.02668
SE. Mean	0.00003	0.00646	0.00106	0.00011	0.00086	0.00008	0.00118	0.00065	0.00167
CI. Mean	0.00007	0.01268	0.00209	0.00022	0.00169	0.00015	0.00232	0.00127	0.00327
Variance	0.00000	0.02168	0.00059	0.00001	0.00038	0.00000	0.00072	0.00020	0.00144
Std. Dev.	0.00078	0.14723	0.02424	0.00255	0.01957	0.00175	0.02692	0.01430	0.03797
Coef. Var.	1.15924	0.22698	0.81192	-3.31574	3.90251	0.59109	0.16565	0.95077	-1.42310

Table 9: Descriptive statistics of post-IFRS9 observations

As per the illustrated overall data statistics, unlike the expectations about the increase in loan loss provisions after IFRS adoption, there is a slight decrease of 16.25% loan loss provision per total assets balance, which is also visible as an 11.36% reduction in allowance per total assets Even though there is an overall increase of 4.2% on average gross loans figures. However, an overall decrease of 12.98% increase in average non-performing loans after the IFRS9 application may explain the decrease in loan loss provision. Overall, the sample ROA on average has decreased by 12.46%. There is a slight increase in the average Tier 1 capital ratio visible 15.1% to 16.25%. Unlike the Tier 1 ratio, the average Tier 2 ratio shows a decrease from 1.65% to 1.5%. Need to remind that Tier 2 is already adjusted and excluded the maximum allowance that is part of core Tier 2 capital. Therefore, as it seems, without adding the allowance to the nominator, on average, the banks are far from the required 4% (Until December 2018) and 2.5% (From January 2019) minimum Tier 2 ratios. Therefore, there is more incentive to exercise discretion for these figures than Tier 1 ratios since Tier 1 ratios on average are far above the minimum required 2.5% (Until December 2018) and 4% (Since January 2019). However, Tier 2 ratios are more closer to the edge of the minimum requirements. The adjusted ratio has reduced from 1.6% to 1.5% on average which can possibly encourage capital management issues to handle the struggle.

We also exercised Pearson pairwise correlation to investigate possible pairwise correlations between the variables, which illustrated as below:



	ROA	LLP	LOANS	LLR	NPL	ΔNPL	ΔLOANS	TIER1	TIER2	ECLM
ROA		0.356	0.296	-0.277	0.345	-0.008	0.133	-0.178	-0.216	-0.111
LLP	0.356		0.363	-0.603	0.718	-0.07	-0.06	-0.477	-0.19	-0.101
LOANS	0.296	0.363		-0.372	0.468	-0.034	0.184	-0.084	-0.224	0.086
LLR	-0.277	-0.603	-0.372		***-0.727****	0.173	0.141	0.289	0.208	0.059
NPL	0.345	0.718	0.468	***-0.727****		-0.142	-0.127	-0.429	-0.209	-0.084
ΔNPL	-0.008	-0.07	-0.034	0.173	-0.142		0.151	0.092	0.091	-0.04
ΔLOANS	0.133	-0.06	0.184	0.141	-0.127	0.151		0.007	-0.052	0.043
TIER1	-0.178	-0.477	-0.084	0.289	-0.429	0.092	0.007		0.26	0.185
TIER2	-0.216	-0.19	-0.224	0.208	-0.209	0.091	-0.052	0.26		-0.031
ECLM	-0.111	-0.101	0.086	0.059	-0.084	-0.04	0.043	0.185	-0.031	

Table 10:Pearson Pairwise Correlation Matrix

Pairwise correlation results show a strong correlation between loan loss reserves and non-performing loans. Since the inclusion of both of these two variables may result in a biased model and multicollinearity, we decided not to include loan loss reserves as part of the non-discretionary component, unlike Kilic et al. model (Emre Kilic, 2013). After removing such variables, we may also perform a VIF test to examine possible multicollinearity before implementing the projected model. The value of almost all the variables is below the critical value of 10. However, LOANS have a VIF value of 11.1, which can be suspicious to multicollinearity. Nevertheless, since the value is close to 10, we may ignore the abovementioned results.

2.7. Preliminary results of the empirical model

We have implemented the projected methodology of the research stepwise by adding and removing the target variables to see whether the overall results remain consistent or not. Additionally, for validation purposes, Tier 1 ratio is replaced with the Tier 2 ratio to inspect the consistency in the results. The dummy variables for banks are included to remove the endogeneity. We omitted country-specific nor period-specific dummies since they become aliased variables with ECLM and bank dummies. All models are statistically significant since the p-value of F-statistics is nearly zero. The R-squared of the models is between 85% to 86%. Much of the high R-squared reflects only public banks in the sample and significant dummies representing 70% of the non-discretionary component. The non-performing loans variable is the only significant variable among other non-discretionary components of the one-step and two-step illustrated models. The sign of the coefficient is positive, as expected. It is important to note that bank dummies are not included in the table, but most of these dummies were highly significant. The ROA coefficient in the model is significant, demonstrating the application of earnings management among the studied banks. After including ECLM and the interaction term ECLM*ROA, even though the coefficients on non-discretionary components did not change, the ROA coefficient becomes less significant. Nevertheless, within 10% critical value, it can still be considered significant, and compared to the coefficient of ECLM*ROA, it is slightly more significant.

Variables	*Model a*			*Model b*			*Model c*			*Model d*		
Predictors	*Estimates*	*p*		*Estimates*	*p*		*Estimates*	*p*		*Estimates*	*p*	
(Intercept)	0.0002	0.136		0.0003	***0.029***	*	0.0008	***0.001***	**	0.0007	***0.001***	**
GLOANS	-0.0001	0.522		-0.0001	0.746		0.0000	0.822		-0.0001	0.491	
DiffGLOANS	-0.0006	0.325		-0.0006	0.3		-0.0007	0.238		-0.0005	0.348	
NPL	0.0111	***<0.001***	***	0.0099	***<0.001***	***	0.0089	***<0.001***	***	0.0092	***<0.001***	***
DiffNPL	0.0033	0.857		0.0036	0.381		0.0044	0.288		0.0035	0.391	
ROA	0.0281	**0.003**	**	0.0174	0.088					0.0139	0.173	
ROA:ECLM				0.0173	0.131					0.0224	***0.052***	.
ECLM				-0.0001	***0.001***	**	-0.0004	***<0.001***	***	-0.0005	***<0.001***	***
TIER1							-0.00229	***0.003***	**	-0.00218	***0.004***	**
TIER1:ECLM							0.00227	***0.003***	**	0.00248	***0.001***	**
R2 / R2 adjusted	0.8527 / 0.8397			0.8551/0.842			0.8559/0.8428			0.8571/0.8439		
F statistics	65.44	***< 2.2e-16***	***		***< 2.2e-16***	***		***< 2.2e-16***	***		***< 2.2e-16***	***

Table 11: One step model to determine ECLM impact on earnings and capital management using TIER1 (Dependent variable: LLP)

Variables	*Model e*			*Model f*		
Predictors	*Estimates*	*p*		*Estimates*	*p*	
(Intercept)	0.0002	0.345		0.0002	0.337	
GLOANS	0.0001	0.707		-0.0001	0.897	
DiffGLOANS	-0.0008	0.154		-0.0005	0.234	
NPL	0.0091	***<0.001***	***	0.0092	***<0.001***	***
DiffNPL	0.0046	0.272		0.0035	0.371	
ROA				0.0161	0.108	
ROA:ECLM				0.0227	**0.063**	.
ECLM	-0.0001	***<0.001***	***	-0.0002	***<0.001***	***
TIER2	0.00090	0.534		-0.0010	0.583	
TIER2:ECLM	0.13700	0.137		0.00298	**0.042**	*
R2 / R2 adjusted	0.8545/0.8413			0.8558/0.8425		
F statistics		***< 2.2e-16***	***		***< 2.2e-16***	***

Table 12: One step model to determine ECLM impact on earnings and capital management using TIER2 (Dependent variable: LLP)

Predictors	*Estimates*	*p*	*Significance*
(Intercept)	0.0002	0.14	
GLOANS	-0.00003	0.864	
DiffGLOANS	-0.0007	0.223	
NPL	0.0115	***<0.001***	***
DiffNPL	0.0039	0.35	
R2 / R2 adjusted		0.851 / 0.838	
F statistics		***< 2.2e-16***	***

Table 13: Two-step model: First Model to determine discretionary component of loan loss provisions (Dependent variable: LLP)

Predictors	*Estimates*	*p*	*Significance*
(Intercept)	0.0002	***0.007***	**
ROA	-0.0029	0.637	
ECLM	-0.0004	***<0.001***	***
TIER1	-0.0010	***0.017***	*
ROA:ECLM	0.0204	***<0.001***	*
TIER1:ECLM	0.0019	***0.004***	**
R2 / R2 adjusted		0.024/0.020	
F statistics	5.58	***2.32E-07***	***

Table 14:Two-step model: Second Model to examine the effect of ECLM implementation - TIER 1 (Dependent variable: Discretionary component of LLP)

Predictors	*Estimates*	*Std. error*	*p*	*Significance*
(Intercept)	0.00004	0.00003	0.194	
ROA	-0.0010	0.00639	0.877	
ECLM	-0.0002	0.0000	***0.001***	**
TIER2	-0.0003	0.0008	0.716	
ROA:ECLM	0.0184	0.0101	<***0.001***	***
TIER2:ECLM	0.00164	0.0012	0.176	
R2 / R2 adjusted	0.018 / 0.014			
F statistics	4.24		***8.08E-04***	**

Table 15: Two-step model: Second Model to examine the effect of ECLM implementation - TIER 2 (Dependent variable Discretionary component of LLP)

In one-step model (b), the ECLM binary variable is highly significant and negative, which may explain the significance of the IFRS9 in reducing loan loss provisioning figures since 1 January 2018. Model (c) includes ECLM and variables related to capital adequacy ratios. The same coefficient is measured for ECLM, emphasizing the overall impact on the decrease in loan loss provisioning. Both the TIER1 variable and TIER1*ECLM are statistically significant. TIER 1 coefficient is consistent with the expectations to have a negative sign since LLP only reduces this capital ratio, and there is no allowance included in the nominator to increase the ratio.

Furthermore, the positive and almost similar value of the TIER1*ECLM coefficient suggests an increase in the TIER 1 ratio after IFRS9 implementation that offsets the overall negative relation between TIER1 and LLP. Since both values are significant, the model suggests consistent capital management after IFRS 9 but managing the ratio changed since the sign of the coefficient is different, which means that the banks before IFRS9 were trying to reduce LLP to maintain and increase the TIER 1 ratio. After IFRS9, they do the opposite and increase LLP at the expense of reducing the TIER1 ratio. The reduction may be due to the preference of earnings smoothing motives instead of capital management incentives. Moreover, improvements in Tier 2 can possibly compensate such reduction since the banks have far higher Tier 1 ratios than Tier 2 ratios. Model (d) can explain the general application of earnings and capital management in one place. TIER 1 and TIER1*ECLM have similar results to model (c). Also, ECLM has the same significance and sign as model b and model (c). The signs of ROA and ROA*ECLM are both positive same as model (b). However, in model (d), the coefficient of ROA*ECLM is more significant than ROA (Close to 5% critical value, which can still be considered significant at 6% or higher critical

values). The result is in line with Anandrajan et al. empirical results, which means that the EU banks used LLP as an earnings management proxy after applying IFRS 9. The positive sign means that the banks with higher earnings tend to increase their LLP, and the ones with lower earnings tend to reduce the LLP. The results with TIER 2 and two-step models are pretty close and consistent with the one-step model with TIER 1.

2.8. Regional comparison and cross-validation of the results

We have divided the examined European countries into subregions and examine each of these subregions to realize whether the results would differ or not. The observations for each of the central, western, southern and west eastern, and Scandinavian region would be as below:

Region	*Country*	*Before ECLM*	*After ECLM*	*Total*
Central Europe	Austria	25	23	48
	Czech Republic	18	19	37
	Germany	67	46	113
	Hungary	12	9	21
	Poland	75	52	127
	Slovakia	0	10	10
	Total	197	159	**356**
Western Europe	Belgium	14	11	25
	France	41	24	65
	Netherlands	20	18	38
	Ireland	16	14	30
	Total	91	67	**158**
Southern and South Western Europe	Cyprus	1	7	8
	Greece	6	20	26
	Slovenia	0	8	8
	Italy	85	62	147
	Portugal	20	16	36
	Spain	32	31	63
	Total	144	144	**288**
Scandinavian region	Denmark	94	75	169
	Finland	45	42	87
	Sweden	42	33	75
	Total	181	150	**331**
	Grand Total	613	520	1133

Table 16:Illustration of the classified regions for the data observations before and after ECLM application

The table below shows the mean of loan loss provision of each region before and after the ECLM application. There have been decreases in loan loss provisions in all regions from which Scandinavian observations had the most significant decline, and Southern Europe had the minor changes. Decreases in ROA could derive the possible earnings management within each region. Central Europe has experienced the lowest decrease of 9% in ROA, and the Scandinavian region had the highest decrease of 27% in average ROA. However, the western Europe region has improvements of 3% in ROA after ECLM adoption.

Region	*LLP Mean before ECLM*	*LLP Mean after ECLM*	*Changes*
Central Europe	0.00082271	0.000622564	24%
Western Europe	0.000391502	0.000246351	37%
Southern Europe	0.001719069	0.001510195	12%
Scandinavian Region	0.000369013	0.000117288	68%

Table 17: Changes in LLP means before and after ECLM application per region

Region	ROA Mean before ECLM	ROA Mean after ECLM	Changes
Central Europe	0.003731653	0.003409573	-9%
Western Europe	0.003015426	0.003103795	3%
Southern Europe	0.003895274	0.003349865	-14%
Scandinavian Region	0.002752412	0.002021481	-27%

Table 18: Changes in ROA means before and after ECLM application per region

Region	Tier 1 Mean before ECLM	Tier 1 Mean after ECLM	Changes
Central Europe	0.14733717	0.16030344	9%
Western Europe	0.145310859	0.170032807	17%
Southern Europe	0.134292438	0.143118642	7%
Scandinavian Region	0.172992806	0.180026739	4%

Table 21: Changes in Tier 1 means before and after ECLM application per region

Region	Tier 2 Mean before ECLM	Tier 2 Mean after ECLM	Changes
Central Europe	0.01948717	0.01940269	0%
Western Europe	0.019961967	0.018666546	-6%
Southern Europe	0.009235149	0.008644869	-6%
Scandinavian Region	0.017561303	0.016734629	-5%

Table 22: Changes in Tier 2 means before and after ECLM application per region

The changes in the capital adequacy ratios in each region show overall improvements after ECLM application with the Tier 1 ratio, whereas the Tier 2 ratios have decreased in most regions except central Europe with a closely insignificant change in average.

We exercised the one-step model (model d) on each of these separate regions to observe the consistency with the overall empirical results. As per the results below, the model approves the first hypothesis in the central Europe region since the interaction term ROA*ECLM is more significant than ROA. Banks within Central European countries have income smoothing behavior

(Positive coefficient), whereas Western European countries just exposed earnings management to improve their earnings. However, it declines the first hypothesis regarding capital management as the TIER1*ECLM interaction term is not significant, unlike the TIER1 coefficient. However, the overall empirical results are consistent with the results in western Europe observations since both interaction terms ROA*ECLM and TIER1*ECLM are statistically significant, unlike TIER 1 and ROA variables. However, the model is not informative for Scandinavian region observations as the only TIER1 variable is close to the significance criteria. Nevertheless, the main regions approximately have consistent results with the overall model.

Regions	*Central Europe*		*Western Europe*		*Southern Europe*		*Scandinavian Region*	
Predictors	*Estimates*	*Sign.*	*Estimates*	*Sign.*	*Estimates*	*Sign.*	*Estimates*	*Sign.*
(Intercept)	0.0009	0.052	0.0009	0.114	0.0024	***<0.001***	0.0008	0.1266
GLOANS	0.0000	0.924	-0.0005	0.457	-0.0003	0.35	0.0002	0.6569
DiffGLOANS	-0.0020	0.068	0.0011	0.478	-0.0003	0.795	-0.0008	0.2362
NPL	0.0165	***<0.001***	0.0082	***0.029***	0.0050	***0.026***	0.0096	0.5690
DiffNPL	-0.0029	0.724	-0.0011	0.906	0.0044	0.545	0.0257	0.2284
ROA	0.0086	0.746	0.0728	0.031	0.0117	0.436	0.1219	0.3937
ROA:ECLM	0.0404	***0.048***	-0.0576	***0.142***	0.0382	0.098	0.0382	0.7400
ECLM	-0.0002	0.616	-0.0007	***0.051***	-0.0012	***<0.001***	-0.0007	0.3316
TIER1	-0.0046	***0.005***	-0.0040	0.087	-0.0002	0.886	-0.0063	0.0645
TIER1:ECLM	0.0006	0.75	0.0054	***0.011***	0.0064	***0.001***	0.0040	0.4545

Table 19:Results of the application of the one-step model per region

2.9. Interpretation of the findings

Most of the implemented models approve the hypothesis about higher earnings management after IFRS9. There is a slight increase in the significance of the interaction term of ROA with ECLM. As the Basel III Tier 1 is not affected by the allowance figure and only Tier 2 is manageable through provisioning; this may make sense to some extent. Moreover, most banks have a high gap between the minimum required Tier 1 and reported Tier 1, which means they do not need to manage such figures. On the other hand, Tier 2 ratios, after excluding the maximum allowance included within the Tier 2 core capital (1.25% of risk-weighted assets), allowance becomes a crucial figure in adherence to this adequacy ratio. The coefficient of TIER 2, regardless of the negative sign, is not significant. The estimates of both models with TIER1 and TIER2 suggest an increase in capital management. Managers possibly have engaged in discretionary behavior to improve earnings and regulatory capital ratios. Managers possibly enjoyed increasing LLP to

increase the allowance and consequently improve Tier 2 ratio. However, the complete model reflects that managers had more incentives to reduce loan loss provisions to improve earnings than capital management incentives involving Tier 2, resulting in improvements in earnings. The explanation is consistent with Tier 1 maintenance since the reduction in LLP also decreases Tier 1 ratio nominator. Conversely, even though the increase in LLP decreases the Tier 1 ratio, due to the high buffer between the average Tier 1 ratio (15.7%) and the minimum 4% or 2.5% regulated ratio, banks may not seem reluctant to smooth income at the expense of deteriorating Tier 1 ratio.

The results align with Gebhardt's and Anandrajan's studies as switching back from the incurred loss model to the expected loss model similar to former domestic models has caused more earnings management and fewer earnings quality. However, unlike Anandrajan's studies, we discovered evidence on capital management as well. Moreover, the possible increase in earnings management due to the new model's additional discretion is what Gomma also stated in his research.

Conclusion

Since the IFRS adoption among the European Union members and especially banking sector, IFRS research and the implication of the changes in the standards on reporting quality and economy has been crucial. This research narrowed the study on the impact of IFRS 9 newly announced expected credit loss model application on the reporting quality using earnings and capital management as proxies. The model's announcement gave rise to a lot of critics and controversies about whether such model would be appropriate, informative and timely compared to the incurred loss model. Even though most of the researches after IFRS adoption in Europe agreed about improvements in earnings quality following by reduction in earnings management, The Incurred Loss model was evaluated as a weak recognition model during the financial crisis due to delayed recognition, causing increased income smoothing among the banks (Lee J. Cohen, 2014) and other firms (Vedran Capkun, 2016). They expected the new model to be more fair, transparent, and valuable in presenting loan loss provisions.

Unlike what was claimed by professionals on increased allowances with the new model (Laure Guegan, 2018), European banks within all regions have experienced decreases in their loan loss provisioning after the application of ECLM. The analysis shows that the expected credit loss model adoption has decreased the provisioning. However, such decreases can be due to assets reclassification to fair value through profit or loss for which such provisioning is no longer applied. Based on the empirical methodology and results stated and validated with omitting and applying alternative variables for capital management, we can confirm the first hypothesis that the extent of earning management within the EU banking sector has increased after IFRS9 implementation. The banks have exercised more earnings management to smooth their income after the ECLM application. However, the method of earnings management differs between the regions, and some countries are either not exposed or not increased exposure to such behavior. Moreover, the extent of capital management also has increased but not in a known way. In our case, earnings management disincentive made the managers apply the loan loss provision as a reservoir for future write-offs and adjustments to maintain the earnings level at the expense of decreased TIER1 capital ratio. The vast gap between the Tier 1 capital ratio and the minimum requirement can explain such behavior. The additional LLP recognized by the manager also possibly improves the TIER2 figure,

which makes sense as the ratios are so close to the minimum requirements. Therefore, improvements in the Tier 2 ratio pay off disincentives in reducing Tier 1 ratio.

As the result of the study, we believe that regulatory bodies, professionals, and researchers need to investigate the topic further to ensure the maintenance of the reporting quality as the changes have always been part of the EU commission members' concern. Even though this research provided evidence on the increased level of earnings and capital management after IFRS 9, the improved reporting quality provided by additional disclosure requirements with the new standard has not been considered. Moreover, implemented methodology and research data lacked fair value remeasurement adjustments and other IFRS 9 related items. We recommend including such items as security gains or losses in future related studies to improve the model and make it more representative since IFRS9 also involves measuring and recognizing fair valuation for financial assets. Loan loss provision may not be the only earnings management proxy. It can be helpful to investigate and examine how much the newly introduced Basel ratios have improved earnings and capital quality within the banking sector.

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